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Volume 1/ Issue 2

## Cotton Weed Management on the Texas Southern High Plains

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### **EARLY- AND MID- POSTEMERGENCE OVER-THE- TOP OPTIONS**

#### **Roundup PowerMax® (glyphosate).**

The following information was obtained from the Roundup PowerMax label (<http://www.cdms.net/LDat/ld8CC010.pdf>). We discussed this herbicide in the preplant section, but this section involves postemergence over-the-top applications in Roundup Ready Flex Cotton and Glytol cotton varieties. Use 22 to 32 oz per acre to control emerged weeds. Common over-the-top tank mix partners include Dual Magnum (and other metolachlor formulations), Warrant, Prowl (and other pendimethalin formulations), Staple (and other pyrithiobac formulations), and several grass-inhibiting herbicides such as Select (and other clethodim formulations). Read and follow label directions for all products in the tank mixture. Staple in tank mixture may cause leaf yellowing and/or leaf crinkling and Dual Magnum may cause some necrotic spotting.

**Liberty® 280 SL** is a group 10 herbicide. It is labeled for use in several crops, but this discussion involves over-the-top application in cotton designated as LibertyLink®. The use rates for Liberty is 22 to 29 oz/A at selected weed heights/diameters shown on the label (<http://www.cdms.net/ldat/>

[ldUA5002.pdf](#)). In LibertyLink cotton, three (3) 29 oz applications may be made per season for a seasonal max of 87 oz/A. Should environmental conditions prevent a timely application, a single application up to 43 oz/A may be made. If more than 29 oz/A is used in any single application, the seasonal total may not exceed 72 oz/A. To maximize control, do not cultivate from 5 days before application to 7 days after an application. A broadcast rate of 15 to 20 gallons of water per acre should be used so that thorough spray coverage is obtained. For optimal weed control, use nozzles and pressures that generate medium (300 to 400 microns) spray droplets. Coarse droplets may not provide adequate spray coverage, while fine droplets increase the risk of spray drift. Liberty 280 SL may be applied in a tank mix with other products provided these products are labeled for use postemergence over-the-top and do not contain a label prohibiting against such a mix. Common tank mix partners include Dual Magnum (and other metolachlor formulations), Staple (and other pyrithiobac formulations), and several of the POST grass herbicides including Select (and other clethodim formulations) and Poast Plus. If Liberty 280 SL is to be mixed with pesticide products not listed on the label, test the compatibility of the intended tank mixture using a jar test (see la-

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## Cotton Weed Management on the Texas Southern High Plains

**Staple® LX** is a group 2 herbicide that may be used preemergence, postemergence, and postemergence-directed in Texas; however, information in this section pertains to postemergence over-the-top applications only. Staple LX controls a wide range of broadleaf weeds in cotton, but weed height is critical for maximum herbicide activity. According to the label (<http://www.cdms.net/ldat/ld7DD009.pdf>), growth heights for devil's-claw, ivyleaf morningglory, Russian thistle, and lanceleaf sage are 1 to 2 inches, 1 to 4 inches, 1 to 2 inches, and 0.25 to 0.5 inches, respectively. Height for pigweeds (redroot, smooth, spiny, and tumble) is 1 to 2 inches. Palmer amaranth is listed under the "weeds suppressed" section of the label and biotypes of resistance exist. Apply Staple LX at 2.6 to 3.8 fl oz/A to young, actively growing weeds. The greater rate may be needed for arid growing conditions or where weed infestations are severe. Although using either a nonionic surfactant (0.25 to 0.5% V/V) or crop oil concentrate (1 to 2% V/V) is mentioned on the label, a crop oil concentrate is the adjuvant of choice in arid regions. Staple LX may be tank mixed with other suitable registered herbicides. Tank mix partners mentioned on the label include Assure® II (other post grass herbicides can result in antagonism), Liberty (in LibertyLink cotton), and glyphosate (glyphosate tolerant cotton) (see label for rates for this tank mix combinations). Do not rotate to grain sorghum in the season following a Staple LX application.

**Envoke®** is a group 2 herbicide that may be used postemergence over-the-top and/or postemergence-directed for selective control of certain broadleaf, sedge, and grass weeds in cotton (<http://www.cdms.net/ldat/ld6DU006.pdf>). Directions for use in cotton are divided into 3 geographical regions and zones within a region. In region 2, zone 3, use postemergence over-the-top on picker type varieties only. Apply Envoke at 0.10 to 0.15 oz/A to actively growing weeds at weed heights specified on the label when cotton has reached 5 true leaves. Use a quality nonionic surfactant (NIS) at 0.25% volume/volume (V/V). Do not apply in tank mix with any other herbicide, fertilizer, or additive other than NIS.

**Dual Magnum®** may be used postemergence for its soil residual activity. Since Dual Magnum has no postemergence activity, control weeds mechanically or by using another herbicide in tank mix with Dual Magnum such as glyphosate or Liberty. Dual Magnum may be applied postemergence over-the-top to the soil surface according to the rate restrictions listed on the label by state (<http://www.cdms.net/ldat/ld0iA007.pdf>). These applications may be made not later than 100 days before harvest (postemergence-directed not later than 80 days before harvest). In Texas, apply Dual Magnum at 1 to 1.33 pints per acre before August 1. In sprinkler-irrigated areas, apply ½ (coarse-textured soils) to 1-inch (fine-textured soils) to incorporate the Dual Magnum before weed seeds germinate. When mixed with Touchdown brands or Roundup brands for use on Roundup Ready cotton, do not add additional spray adjuvants, surfactants, fertilizer additives, or pesticides to this tank mixture if applied postemergence over-the-top, or unacceptable injury may occur. This mix may cause temporary injury in the form of necrotic spotting to exposed cotton leaves, which will not affect normal plant development. Do not use on sand or loamy sand soils in Gaines County, TX. According to the Liberty 280 SL label, Dual Magnum may be tank-mixed and applied postemergence over-the-top to provide residual activity.

**Prowl® H2O** at 1 to 2 pints per the soil texture may be applied postemergence over-the-top after cotton reaches the 4-leaf stage of growth, but not after the 8-leaf stage of growth. Over-the-top applications made before the 4-leaf stage or after the 8-leaf stage may result crop injury and/or yield loss. Postemergence treatments are most effective when adequate rainfall or overhead irrigation is received after application. Apply before weeds emerge or use with a postemergence herbicide to control emerged weeds. Prowl H2O may be tank mixed with Roundup PowerMax in Roundup Ready Flex cotton or with Liberty in LibertyLink cotton.

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**Warrant®** is a group 15 herbicide that provides preemergence weed control. The amount of precipitation or irrigation required to “activate” the herbicide (move into the soil where the weed seeds are germinating and emerging) depends on existing soil moisture, soil type, and organic matter content, but ½ to ¾ inch is normally adequate. If weeds have emerged, apply a labeled postemergence herbicide with this product to control emerged weeds. According to the Warrant label (<http://www.cdms.net/ldat/ld9KA005.pdf>), recommended tank mix partners for postemergence over-the-top treatments include Roundup, Liberty, Staple (and other generics), and several POST-grass herbicides such as Assure II, Fusilade, Poast Plus (and other generics), Select Max (and other generics). Broadcast rates per acre by soil textural groups with soils with less than 1.5% organic matter are provided above for Warrant listed in the preemergence section. Do not exceed 4 quarts per acre per year when making a second application, including a postemergence application.

**Outlook®** is a group 15 herbicide label for use in several crops (<http://www.cdms.net/ldat/ld3LS008.pdf>) and recently received a supplemental label (<http://www.cdms.net/ldat/ld3LS005.pdf>) for use until March 1, 2018. Apply Outlook at 21 fl oz/A as a broadcast spray from first true leaf stage to mid-bloom stage (i.e. two weeks after R1 initial bloom stage). Outlook must be applied before weeds emerge or used in tank mix with products registered for use on cotton that control emerged weeds. For effective control, “activation” by rainfall, sprinkler irrigation, or shallow incorporation is needed after application to move the herbicide into the upper soil surface where weed seeds germinate. Do not apply on coarse soils classified as sand (does not include loamy sand or sandy loam) with less than 3% organic matter. Outlook may cause temporary leaf burn, spotting, and/or stunting, but a reduction in cotton yield is not expected. Adjuvants may be applied with Outlook when making early postemergence applications. Mixing Outlook with other emulsifiable concentrate (EC) formulated products may increase potential for cotton injury.

### POSTEMERGENCE-DIRECTED / LATE-POSTEMERGENCE / LAYBY

**MSMA** is a group 17 herbicide for selective use postemergence-directed to cotton between 3-inches tall to first bloom. Apply at 40 gallons of water per acre. If regrowth occurs, a sequential application may be made 1 to 3 weeks after the initial application. Do not apply after first bloom. The information above pertains to the Drexel MSMA 6.6 label (<http://www.cdms.net/ldat/ld47N000.pdf>).

**Liberty® 280 SL** and other glufosinate products may be applied late-season as well as at application timings described previously. Liberty may be applied to conventional or other transgenic cotton not tolerant to the active ingredient Liberty 280 SL using a hooded sprayer to avoid particles from coming into contact with the plant foliage. Liberty rates, seasonal rate restrictions, and common tank mix partners were described previously in the early and mid-postemergence section. Do not apply Liberty within 70 days of cotton harvest.

**Layby™ Pro** is 4 pound per gallon premix of linuron (2 pounds) and diuron (2 pounds) labeled for use in cotton. Layby Pro provides preemergence and postemergence control of key broadleaf weeds and grasses in cotton. Apply as a directed or hooded/shielded spray at 1.0 to 1.5 pints per acre to cotton 8 to 15-inches tall. Use the lower rate on smaller cotton and for control of susceptible weeds less than 1-inch tall. Use the higher rate on larger cotton for control of susceptible weeds up to 2-inches tall. For control of susceptible emerged weeds up to 4-inches tall and in cotton 15-inches or taller, apply 1.6 pts/A (coarse soils), 2 pts/A (medium soils), or 2.4 pts/A (fine soils) to actively growing weeds. The addition of an adjuvant is recommended for postemergence control. Layby Pro may be tank mixed with other herbicides labeled for postemergence-directed, hooded/shielded sprayer, and/or layby use in cotton, including MSMA, paraquat, Aim, and glyphosate (Roundup Ready varieties only).

## Cotton Weed Management on the Texas Southern High Plains

**Roundup PowerMax®** and other glyphosate may be applied late-season as well as at the application timings described previously in this document. In **Roundup Ready Flex cotton**, total in-crop applications from cracking (emergence) to 60% open bolls is 4 quarts per acre. This product may be tank-mixed for precision post-directed or hooded sprayers with the following herbicides: Aim (and other carfentrazone-ethyl products), Caparol (and other prometryn products), Valor (Chateau, Rowel, and other flumioxazin products), Direx (and other diuron products), Layby-Pro, MSMA (and other monosodium acid methanearsonate products), Prowl (Prowl H2O and other pendimethalin products), Cotoran (and other fluometuron products), and linuron. The in-crop use rate is 22 to 32 fluid ounces per acre (maximum 32 ounces when using ground equipment and 22 ounces when using aerial application equipment). Between layby and 60 percent open boll, the maximum rate is 44 ounces. Up to 44 ounces per acre may be applied preharvest for annual and perennial weed control prior to harvest after 60 percent open boll. This product will not enhance the performance of harvest aids when applied to Roundup Ready cotton. Do not add additional surfactant or additives containing surfactant to this product for preharvest (and in-crop) applications. Allow a minimum of 7 days between application and cotton harvest. In **non-Roundup Ready cotton**, this product may be applied using a hooded or shielded sprayer, or over the top of cotton using a wiper applicator to control tall weeds. It may also be used as a spot treatment prior to boll opening. Do not apply to more than 10% of the total field area. For cotton regrowth inhibition, apply 16 to 44 ounces per acre. Make a preharvest application only after sufficient bolls have developed to produce the desired yield. Application made prior to this time could affect maximum yield potential. Allow a minimum of 7 days between application and harvest. Do not add additional surfactant or additives containing surfactant to this product for preharvest application to cotton.

**Caparol** may be applied postemergence-directed to cotton at layby (12-inches or taller) and weeds to be controlled by Caparol are less than 2-inches tall. Use a surfactant that is compatible with Caparol. It may be

applied in tank mix with Touchdown or other appropriately labeled formulation of glyphosate. Applications must be made with a shielded or hooded sprayer to avoid contact of the spray to cotton leaves. Spray which contacts cotton leaves may cause injury. Apply during calm periods to prevent drift. Do not use on sand or loamy sand soils in Gaines County. Cotton and corn may be planted 5 months after applying Caparol. Check the label for additional rotational crop information (<http://www.cdms.net/ldat/ld515003.pdf>).

**Anthem Flex** (<http://www.cdms.net/ldat/ldC07000.pdf>) is a group 14 and 15 herbicide comprised of a premix of pyroxasulfone (Zidua®) and carfentrazone (Aim®) for use postemergence-directed in cotton. Apply Anthem Flex to cotton from 6-inch to beginning bloom. DO NOT apply Anthem Flex directly to cotton as a broadcast postemergence spray after emergence (at-cracking) or injury may occur. The amount of Anthem Flex to apply and the degree of weed control depends on a variety of factors such as weeds present, stage of growth, environmental conditions, growing conditions, and soil type. Under high moisture conditions, cotton may experience some temporary response; however, cotton will rapidly outgrow these effects and develop normally with no reduction in yield. Apply Anthem Flex at 1.4 to 2.7 fl oz/A in medium soils and 2.85 to 3.8 fl oz/A in fine soils. DO NOT APPLY Anthem Flex in coarse (sand, loamy sand, sandy loam) soils. The maximum combined rate of Anthem Flex in cotton that may be applied in a cropping season is 7.6 fl oz/A (0.223 lb ai/A containing 0.222 lb ai of pyroxasulfone and 0.0159 lb ai of carfentrazone). Rainfall and/or irrigation totaling at least 0.5 inches prior to weed emergence may be necessary for herbicide activation and optimum weed control.



## Cotton Weed Management on the Texas Southern High Plains

**Zidua®** (pyroxasulfone) is a new group 15 herbicide that is registered for use in cotton postemergence-directed (layby). Some visual cotton response is possible when Zidua is applied under stressful conditions (inadequate or excessive moisture, temperature extremes, compacted soils, injury from other pesticides, disease or other pest damage, mechanical injury, nutrient imbalances, or other conditions known to cause plant stress). Before applying Zidua in cotton, verify with your local seed company (supplier) the selectivity of Zidua on your variety to avoid potential injury. Zidua is a selective rate-dependent preemergence herbicide that controls annual grass weeds, sedges, and annual broadleaf weeds. Apply Zidua postemergence-directed between cotton rows from 5-leaf stage to beginning bloom stage at 0.75 to 1.5 oz/A (medium soil) or 1.5 to 2.1 oz/A (fine soil). DO NOT USE in coarse-textured soils. Zidua will provide residual weed control after application. Zidua will not control weeds that have emerged prior to application. These weeds must be controlled by cultivation or by another herbicide applied in tank mix or sequential application. Tank mix or apply Zidua sequentially with one or more of, but not limited to, the following herbicides: Prowl H2O, glufosinate, glyphosate. Always follow the most restrictive label use directions when mixing herbicides. Follow the adjuvant recommendation for the tank mix partner of Zidua.

**ET®X** may be used in postemergence-directed to control broadleaf weeds. Rates of ETX range from 0.3 to 1.25 fl oz per acre. Use hooded equipment to cotton having less than 3 inches of stem bark to avoid contact on desirable vegetation. Do not apply more than 1.25 fl oz per acre per season. Allow 30 days between applications. For lay-by applications when cotton averages 18 inches or more in height and has at least 3 inches of stem bark, use a hooded or directed spray equipment. Rates for this application timing are 0.3 to 0.6 fl oz per acre. Allow a minimum of 30 days between applications and do not apply more than 0.6 fl oz per season for this application timing. ETX has a PHI of 7 days.

**Direx 4L** (<http://www.cdms.net/ldat/ldA89000.pdf>) may be used as a directed postemergence application in cotton. Adjust nozzles to cover weed foliage but avoid contact of crop foliage. Applications may also be made in hooded/shielded sprayers. Use 0.4 (6 to 8 inch cotton) to 0.6 quarts (8 to 12 inch cotton) on annual weeds up to 2-inches tall. For late-season (lay by) applications, apply 0.8 to 1.2 quarts per acre when cotton is at least 12 inches tall. In irrigated cotton, best control is obtained if fields are irrigated within 3 to 4 days after application. If weeds are emerged at application (4 inches or less), use a surfactant.

**Aim EC** may be used as a directed spray in cotton to control broadleaf weeds up to four (4) inches in height and rosettes less than 3 inches in diameter at rates ranging from 0.5 to 2 fluid oz per acre. Hooded sprayers must be designed, adjusted, and operated in a manner to totally enclose the spray to prevent spray deposition on green stem tissue, foliage, blooms, or fruits of the crop. Do not operate at speeds more than five (5) miles per hour and use a minimum of 10 GPA. A nonionic surfactant, crop oil concentrate, or methylated seed oil is required. Do not apply more than 3.2 fl oz per season by postemergence-directed and lay-by applications. Aim may be mixed with other herbicides labeled for cotton postemergence-directed and lay-by. A preharvest interval (PHI) for Aim EC is 7 days. <http://www.cdms.net/ldat/ld5L1018.pdf>

## Cotton Weed Management on the Texas Southern High Plains

**Fierce** (<http://www.cdms.net/ldat/ldB4C001.pdf>) is a group 14 and 15 herbicide comprised of a premix of pyroxasulfone (Zidua®) and flumioxazin (Valor®) for use postemergence-directed in no-till and minimum-till cotton. Fierce may be applied with a hooded or shielded sprayer after cotton has reached a minimum of 6 inches in height. Care must be taken to ensure the spray solution or drift does not come in contact with the cotton or severe injury may occur. Fierce should be applied using a hooded or shielded sprayer at 3 oz/A in combination with MSMA, diuron, or glyphosate. Apply to actively growing weeds within the growth states indicated on the label. Do not apply when crop or weeds are under stress (drought, excessive water, temperature extremes, disease or low humidity). A layby application may be made once the cotton has reached a minimum of 16 inches in height. Cotton smaller than 16 inches may be injured. Applications must be directed to the lower 2 inches of cotton stem to avoid injury. Do not apply more than 3 oz Fierce per acre during a single application. Do not apply more than 6 oz per acre during a single growing season. Do not make sequential applications with 30 days. Do not apply within 60 days of harvest. A supplemental Fierce label for postemergence-directed and layby use in conventional cotton (<http://www.cdms.net/ldat/ldB4C008.pdf>) expires August 16, 2016. Label use and restrictions for this supplemental label look similar to the Federal 3 label.

**Since product labels change from year to year, always carefully read and follow label recommendations for a variety of information, including herbicide rate, adjuvant use, interval restrictions between application and planting, or other application restrictions.**

**These are the 4 Weed Management of Palmer Amaranth videos created last year by Texas A&M AgriLife Extension. These videos are also posted on our website.**

1. History and Biology of Palmer amaranth  
<http://youtu.be/QbA45TgJEgg>
2. Weed Control prior to Emergence  
<http://youtu.be/-OeD0p1YPQg>
3. Control of Weeds after Emergence  
<http://youtu.be/cFgZbPD8Dhs>
4. New Technologies for Weed Management  
<http://youtu.be/22kDZkVZ4IE>



## Private Pesticide Applicators Training

The Texas A&M AgriLife Extension Service will offer the required private Pesticide Applicators Training (PAT) in Levelland on April 28 and again on May 26, 2016 in Littlefield. This training is required by Texas Department of Agriculture before taking the exam for obtaining the license. A private pesticide applicator is a person who uses or supervises the use of a restricted-use or state limited-use pesticide or a regulated herbicide for the purpose of producing an agricultural commodity. This license is not for those receiving monetary compensation for a pesticide application. The cost of the license was raised by TDA from \$60 to \$100 this year.

To participate in a training individuals must call 806-894-3159 by 3pm the day prior (Wednesday) to the training in Levelland or 806-385-4222 ext 235 by 3pm the day prior (Wednesday) to the training on May 26 in Littlefield. The trainings will begin promptly at 1pm at the Extension Offices (see addresses below). There is a \$60 fee for training materials. This is only the required training. Testing will be conducted at a separate time and location.

### Future PAT Trainings:

June 27 Morton Extension Office 200 W. Taylor Avenue

July 28 Levelland Extension Office 1212 Houston Street

August **25** Littlefield Extension Office, Courthouse, Room B-5

September 22 Morton Extension Office 200 W. Taylor Avenue

October 27 Levelland Extension Office 1212 Houston Street

November **17** Littlefield Extension Office, Courthouse, Room B-5

and December 19 Morton Extension Office 200 W. Taylor Avenue

*Texas A&M AgriLife Extension seeks to provide reasonable accommodations for all persons with disabilities for any educational meetings. Please contact us to advise us of the auxiliary aid or service that you will require a week in advance of a training.*

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